detection device embedded within said at least one optical fiber to detect a change in strain in said at least one optical fiber; and

A1

means for limiting the bending of said at least one optical fiber.

15. (Amended) A system according to claim 11 wherein said bend limiting means comprises a gap between an outer surface of said bend rod and inner surface of said mount assembly and said gap being selected so that at a certain maximum curvature the bending of the bend rod is limited by the mount assembly and so that the optical fibers and the detection devices experience no further strain at smaller bend diameters.

A2

21. (Amended) A system according to claim 19 wherein said bend limiting means comprises: a mount assembly inside said bend cylinder; a gap between an inner surface of said bend cylinder and an outer surface of said mount assembly; and said gap being sized to limit the bending of said optical fibers.

A3

24. (Amended) A curvature sensor comprising:

A4

a bend member;

at least one optical fiber within the bend member;

at least one detection device embedded within said at least one optical fiber to detect a change in strain in said at least one optical fiber; and

means for limiting the bending of said at least one optical fiber.

25. (Amended) A curvature sensor according to claim 24 wherein said at least one detection device comprises an optical fiber Bragg grating.

26. (Amended) A curvature sensor according to claim 24 wherein said at least one detection device comprises an optical fiber Bragg grating laser.

27. (Amended) A curvature sensor according to claim 24 wherein each said optical fiber has a plurality of detection devices embedded therein.

28. (Amended) A curvature sensor according to claim 27 wherein each of said detection devices operates at a different wavelength.

29. (Amended) A curvature sensor according to claim 24 wherein each said optical fiber has a plurality of detection devices embedded therein.

30. (Amended) A curvature sensor according to claim 29 wherein each of said legs has a detection device incorporated therein.

31. (Amended) A curvature sensor according to claim 24 wherein said bend member comprises a bend rod and wherein said curvature sensor has at least three optical fibers embedded within said bend rod.

32. (Amended) A curvature sensor according to claim 31 wherein said bend rod has a length and each of said optical fibers runs longitudinally down the length of the bend rod and wherein said optical fibers are radially distributed around the perimeter of the bend rod.

33. (Amended) A curvature sensor according to claim 24 wherein said bend member comprises a bend cylinder and wherein said curvature sensor has a plurality of optical fibers embedded within said bend cylinder.

34. (Amended) A system for determining the curvature and shape of a towed hydrophone array comprising:

a plurality of curvature sensors positioned along the length of the towed hydrophone array;

each of said curvature sensors comprising a bend member which bends as the array bends, at least one optical fiber within the bend member, at least one detection device embedded within said at least one optical fiber to detect a change in strain in said at least one optical fiber, and means for limiting the bending of said at least one optical fiber; and

a plurality of roll sensors positioned along the length of the towed hydrophone array with each of said roll sensors being in close proximity to a respective one of aid curvature sensors.